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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,138	11/14/2003	Chih-Ta Star Sung		8199

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EXAMINER

FINDLEY, CHRISTOPHER G

ART UNIT	PAPER NUMBER
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2621

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/712,138

Applicant(s)

SUNG ET AL.

Examiner

Christopher Findley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☒ Claim(s) 21 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application
- ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. Claim 21 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 20. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

4. Claim 19 recites the limitation " the surrounding pixels are pixel from left and top of a target pixel" in lines 16-17. There is insufficient antecedent basis for this limitation in the claim. Claim 16, from which claim 19 draws its dependency, fails to mention either a target pixel or the pixels surrounding a target pixel. For the purposes of prior art analysis, the language in claim 19 will be interpreted as referring to the pixels surrounding a target pixel within a target block.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Lempel (US 5796434 A).

Re claim 1, Lempel discloses a method for decoding a video bitstream where DCT values are stored to a memory for future reference (column 15, lines 20-24) and inverse DCT information is stored to a frame memory (Fig. 5/120A). Block matching is performed in the DCT/frequency domain using the stored DCT values from previous frames (column 14, lines 4-12 and 28-42). Lempel also discloses using reference DCT values to generate inverse DCT data (Fig. 5, elements 106B, 250, 126A, and 118A).

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 13 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Sudharsanan et al. (US 6654503 B1).

Re claim 13, Sudharsanan discloses a method of lossless block pixel compression, comprising: subtracting a pixel value from a predicted value to form a pixel difference matrix (column 3, lines 3-9); applying a "Run-Length" packing for re-arranging the pixel difference matrix into a pair of data (column 5, lines 38-40); and using a VLC coding scheme to reduce the amount of bit of representing the pixel difference patterns (column 5, lines 2-4).

Re claim 14, Sudharsanan discloses that a predicted pixel is calculated by an average of the weighted values of surrounding pixels (column 3, lines 51-62; column 4, lines 21-24; Equation (1)).

9. Claims 16-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Wee et al. (US 6697061 B1).

Re claim 16, Wee discloses an apparatus for decoding a video stream, comprising: a storage device for storing compressed data stream and corresponding decompressed pixel data of at least one previous block (column 3, lines 28-38); a device for comparing a coming compressed stream to at least one previously saved stream (column 4, lines 31-36); and a device of selecting one of previously saved decoded blocks to represent a target block if a target block is identical to one of the previously saved blocks (column 3, lines 47-55).

Re claim 17, Wee discloses that an output of a comparator is used to select the decoded pixels to represent the target block pixels (column 5, lines 11-32; column 8, lines 58-65).

Re claim 18, Wee discloses that decoded block pixels represent the target block pixels by copying the decoded block pixels (column 5, lines 27-33).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 2-12 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lempel (US 5796434 A) in view of Wee et al. (US 6697061 B1).

Re claim 2, Lempel discloses a block matching method performed in the DCT/frequency domain, but does not specifically disclose storing the DCT information for the new block if there is no match between a target block and a search block. Wee, however, discloses performing calculations for the new block (Fig. 8/185) if there was a change in the picture, and also storing frame information into a buffer in compressed format (column 3, lines 28-31). Since both Lempel and Wee disclose methods of

processing video data and comparing frames for block matching, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a computationally efficient method for block matching.

Re claim 3, Lempel does not specifically disclose compressing the blocks stored to a memory; however, Wee discloses that the block is saved to a buffer in a compressed format (column 3, lines 28-31). Since both Lempel and Wee disclose methods of processing video data and comparing frames for block matching, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a computationally efficient method for block matching.

Re claim 4, Lempel does not specifically disclose that the blocks match if they are identical; however, Wee discloses an instance where a block of the video frame is unchanged so the previously stored data for the corresponding block is re-used (Fig. 8, code = '00'; column 5, lines 30-33). Since both Lempel and Wee disclose methods of processing video data and comparing frames for block matching, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a computationally efficient method for block matching.

Re claim 5, Lempel discloses that the blocks with the smallest difference constitute a match, but Lempel does not specifically disclose using a threshold to judge the difference between two blocks. However, Wee discloses that the blocks match if the amount of change is below a predetermined threshold (Fig. 8/183; column 8, lines 26-33). Since both Lempel and Wee disclose methods of processing video data and

comparing frames for block matching, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a computationally efficient method for block matching.

Re claim 6, Lempel does not specifically disclose re-using the data from a reference block in a new frame when the reference block is identical to the block from the new frame. However, Wee discloses using previously stored video data if a match occurs between blocks (column 5, lines 30-33). Since both Lempel and Wee disclose methods of processing video data and comparing frames for block matching, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a computationally efficient method for block matching.

Re claim 7, Lempel discloses using a difference metric (absolute differences) in order to compare target and search blocks and assess the closeness of a match (column 16, lines 4-25). Lempel does not specifically disclose using a threshold value to determine the degree of difference. However, Wee discloses that the blocks match if the amount of change is below a predetermined threshold (Fig. 8/183; column 8, lines 26-33). Since both Lempel and Wee disclose methods of processing video data and comparing frames for block matching, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a computationally efficient method for block matching.

Re claim 8, neither Lempel nor Wee specifically discloses that when a weighted difference between at least one previously saved block stream and a target block

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stream is applied to determine whether a lossy decoding is applied in decompressing the video bit stream. However, The Examiner takes Official Notice that when performing block matching, compression is lossless when the difference is large, because this indicates that the blocks are unrelated and subsequently processed independently of the other blocks. When the block differences are within a threshold range, there is some correlation, but the blocks are not identical. Therefore, one of ordinary skill in the art at the time of the invention would have found it obvious that when a difference value is near a threshold, meaning that the target and reference blocks are very similar in value but not identical, there is some loss in accuracy implied by the difference when re-using data from previous frames.

Re claim 9, Lempel does not specifically disclose using a previously stored block if in the current frame if the blocks match according to a threshold. However, Wee discloses that the blocks match if the amount of change is below a predetermined threshold (Fig. 8/183; column 8, lines 26-33). Wee further discloses that the previously stored video data is re-used if the difference falls below a threshold (Fig. 8/183). Since both Lempel and Wee disclose methods of processing video data and comparing frames for block matching, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a computationally efficient method for block matching.

Re claim 10, neither Lempel nor Wee specifically discloses that a compressed bit stream and the corresponding decoded pixels of farthest distance from a target block can be overwritten when the storage device of storing compressed bit stream and

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decoded pixel is short of space. However, The Examiner takes Official Notice that one of ordinary skill in the art at the time of the invention would have found it obvious to delete the data least relevant to the present operation first in order to create space on a memory for information in the present operation if free space is limited, thus creating an efficient way of managing the limited memory space.

Re claim 11, Lempel does not specifically disclose that a decompressed bit stream is compressed before being stored to a buffer for future representing a new block stream. However, Wee discloses that the block is saved to a buffer in a compressed format (column 3, lines 28-31). Since both Lempel and Wee disclose methods of processing video data and comparing frames for block matching, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a computationally efficient method for block matching.

Re claim 12, neither Lempel nor Wee specifically states that a decompressed bit stream is compressed through a lossless compression mechanism before being stored to a buffer and is decompressed for future representing a new block stream. However, The Examiner takes Official Notice that one of ordinary skill in the art at the time of the invention would have found it obvious that a block which is stored to be used as a reference block for future comparisons and re-use would be compressed with as little loss as possible in order to ensure accurate block matching and representation.

Re claim 20, Wee discloses that in decompressing an I-type frame and JPEG still pictures one of previously decoded and saved blocks is selected to represent the target

block (column 7, lines 10-27). Wee does not specifically disclose decompressing an I-type frame or JPEG still without going through a motion compensation device.

However, Lempel discloses processing an Intra frame without utilizing motion estimation/compensation (Fig. 5, elements 130A, 126A, and 128A; column 13, lines 13-24). Since both Lempel and Wee disclose methods of processing video data and comparing frames for block matching, one of ordinary skill in the art at the time of the invention would have found it obvious to combine their teachings in order to provide a computationally efficient method for block matching.

Claim 21 has been analyzed and rejected with respect to claim 20 above.

13. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sudharsanan et al. (US 6654503 B1).

Re claim 15, Sudharsanan does not specifically disclose that the surrounding pixels are pixel from left and top of a target pixel. However, Sudharsanan does disclose an image coder where the predicted pixels are predicted by the weighted values of the surrounding pixels (column 3, lines 51-62; column 4, lines 21-24; Equation (1)). The Examiner takes Official Notice that the number and location of pixels in proximity to a predicted pixel that are used to predict said predicted pixel are arbitrary design constraints selected by the system designer. Therefore, one of ordinary skill in the art at the time of the invention would have found it obvious that any number of pixels at various locations surrounding the predicted pixel could be selected for use in the prediction scheme in order to control the computational complexity, processing requirements, and in turn the picture quality of the compression system.

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14. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wee et al. (US 6697061 B1).

Re claim 19, Wee does not specifically disclose that the pixels surrounding a target pixel are the pixels from the left and top of the target pixel. However, The Examiner takes Official Notice that it is an arbitrary decision by the designer as to which pixels are designated as surrounding pixels for performing calculations. Furthermore, the applicant provides no real advantage or purpose for designating the pixels from the left and top of the target pixel as the surrounding pixels. Therefore, one of ordinary skill in the art at the time of the rejection would have found it obvious that the designer may select whatever combination of surrounding pixels he sees fit in order to achieve the desired balance between computational complexity and quality of results for the video processing apparatus.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a. Quantizing and dequantizing circuitry for an image data companding device

Ito (US 5430556 A)

b. Image encoding apparatus and image decoding apparatus

Yokose et al. (US 6782133 B2)

- c. Compression circuitry for generating an encoded bitstream from a plurality of video frames

Bolton (US 20030231710 A1)

- d. Method of compression-coding a motion picture and an apparatus for same

Fujihara (US 5530479 A)

- e. Coding method and apparatus for resampling and filtering images using discrete cosine transforms

Wober et al. (US 5740284 A)

- f. Conversion system using programmable tables for compressing transform coefficients

Ouyang (US 5835145 A)

- g. Reducing the memory required for decompression by storing compressed information using DCT based techniques

Owen et al. (US 6028635 A)

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Findley whose telephone number is (571) 270-1199. The examiner can normally be reached on Monday-Friday 7:30am-5pm, Alternate Fridays off.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher Findley/


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